2011 - Working Draft

This file contains:

1. **Current national stats on green jobs**
2. **Job impacts from future env/energy policy: prospective estimates**
3. **Job impacts from specific existing Clean Air Act rules**
4. **Handy quotes: Jobs vs Environment tradeoff myth**
5. **Environmental technology / pollution control industry stats**
6. **Job impacts from upcoming Clean Air Act rules (from 6-15-11 hearing prep)**

1) Current National Stats on Green Jobs

- The country as a whole can gain 918,000 to 1.9 million jobs under comprehensive federal energy and climate policy. All 50 states would benefit. David Roland-Holst and Fredrich Kahrl, UC Berkeley, Madhu Khanna, Univ of Illinois, and Jennifer Baka, Yale Univ., *Clean Energy and climate Policy for US Growth and Job Creation*, October, 2009.

- There were 1.8 to 2.4 million jobs in the green economy in 2007. Out of these, between 576,000 and 624,000 were in pollution control. *The Solar Foundation, Cornell University and Green LMI Consulting. National Solar Jobs Census. 2010.*

A U.S. Department of Commerce study shows that by 2007 the following numbers of jobs existed in the "green economy": *U.S. Department of Commerce Economics and Statistics Administration. Measuring the Green Economy. April 2010.*

Renewable/Alternative Energy	36,000 to 120,000
Energy Conservation	846,000 to 1,056,000
Resource Conservation	234,000 to 456,000
Environmental Assessment	108,000 to 144,000
Pollution Control	576,000 to 624,000
Total	1,800,000 to 2,400,000

Energy Efficiency: quick stats

Consumers save energy from appliance, equipment, and lighting efficiency. These savings free up money that can now be spent on other goods that are more labor intensive to produce. Utilities use more capital (machinery and equipment, for example) and less labor than other industries. One study shows that standards already in place created **340,000 full time jobs in 2010 from having saved consumers $34 billion dollars in energy costs**. The same study showed that **for every 100,000 net jobs created by energy efficiency gains, 6,000 are in manufacturing**. *Gold, Nadel, Laitner and De Laski. Appliance and Equipment Efficiency Standards: A Money Maker and Job Creator. American Council for an Energy-Efficient Economy (ACEEE) and Appliance Standards Awareness Project (ASAP). Report Number ASAP-8/ACEEE-A111. January 2011.*

2) Job Impacts from Future Environmental (& Energy) Policy : *Prospective* (projected) Estimates

Employment Potential – Renewable Energy vs. Coal: Quick stats

- *Over the course of a 10-year period the solar industry creates 5.65 jobs per million dollars in investment, the wind energy industry 5.7 jobs, and the coal industry only 3.96.*
  Daniel Kammen, Kamal Kapadia, and Matthias Fripp, "Putting Renewables to Work: How Many Jobs Can the Clean Energy Industry Create?" UC Berkeley: Renewable and Appropriate Energy Laboratory (RAEL), April 2004 (updated January 2006), 12,
  http://rael.berkeley.edu/files/2004/Kammen-Renewable-Jobs-2004.pdf

- *Wind and solar energy generate 40 percent more jobs per dollar invested than does coal mining.* Virinder Singh, BBC Research and Consulting, and Jeffrey Fehrs, "The Work That Goes into Renewable Energy," Renewable Energy Policy Project, November 2001, 8.

- *A New York State Energy Office study concluded that wind energy would create 27% more jobs than coal and 66% more than a natural gas plant per kilowatt hour generated.*
  A.K. Sanghi, *Economic Impacts of Electricity Supply Options*, New York State Energy Office, July 1992.

National Renewable Electricity Standard – 25% by 2025

- ... will create 297,000 new jobs nationally and bring $13.5 billion in economic development to farmers, ranchers, and rural landowners, and lower electricity and natural gas bills by $64.3 billion. *Clean Energy, Green Jobs*, Union of Concerned Scientists, 2009.

- ... will create 274,000 new jobs nationally. All 50 states would see job growth: biomass, hydropower, and waste-to-energy in the Southeast, wind energy in the Great Plains and Midwest, and hydropower and solar power in the West. Navigant Consulting, *Job Impact of a National Renewable Electricity Standard*, February, 2010.

- "Including multiplier effect through the economy, the projected annual impact on the nation from producing and converting feedstocks into energy would be in excess of $700 billion in economic activity and 5.1 million jobs in 2025, most of that in rural areas." Burton C. English, Daniel G. De La Torre Ugarte, Kim Jensen, et. al., Univ. of Tennessee, *25% Renewable Energy for the United States by 2025: Agricultural and Economic Impacts*, November, 2006.

National Renewable Electricity Standard – 20% by 2020

- Two separate recent studies have concluded that if the United States adopted a 20% Renewable Portfolio Standard for its electrical utilities, over 185,000 jobs could be created by the year 2020.
  Daniel Kammen, Kamal Kapadia, and Matthias Fripp, "Putting Renewables to Work: How Many Jobs Can the Clean Energy Industry Create?" UC Berkeley: Renewable and Appropriate Energy Laboratory (RAEL), April 2004 (updated January 2006), 12,
  http://rael.berkeley.edu/files/2004/Kammen-Renewable-Jobs-2004.pdf;
  Union of Concerned Scientists, *Cashing In on Clean Energy*, 2007,
  http://www.ucsusa.org/clean_energy/clean_energy_policies/cashing-in.html

Prospective State-specific Studies – Clean Energy Jobs

- A Union of Concerned Scientists analysis conducted for the state of Wisconsin found that an 800 MW mix of new renewables would create about 22,000 more job-years than would new natural gas and coal plants over a 30-year period.
  Michael Brower, Michael Tennis, and Eric Denzler, *Powering the Midwest*, Union of Concerned Scientists, 1993, 107-108.

- A study by Economic Research Associates of energy efficiency and renewable energy as an economic development strategy in Colorado found an energy bill savings of $1.2 billion for Colorado ratepayers by 2010 with a net gain of 8,400 jobs. The study also assessed nine other states and reached similar conclusions.
  Skip Laitner and Marshall Goldberg, *Energy Efficiency and Renewable Energy Technologies as an Economic Development Strategy*, April 1996, http://solstice.crest.org/renewables/era/index.html

- In 2001, the California Energy Commission's Public Interest Energy Research program sponsored a study from the Electric Power Research Institute (EPRI) that included job creation estimates from renewable energy development based on existing and planned projects in California. These include a construction employment rate ranging from 2.57 jobs/MW for wind to 7.14 jobs/MW for solar photovoltaic (PV) systems, and an operating employment rate ranging from 0.12 jobs/MW for PV to 2.28 jobs/MW for landfill digester gas.
  Brad Heavner and Bernadette Del Chiaro, Renewable Energy and Jobs, Environment California Research and Policy Center, 2003,
  http://www.environmentcalifornia.org/uploads/OW/aa/OWaa2RaedlfHwQOWbxKd5w/Renewable_Energy_and_Jobs.pdf

3) Job Impacts from Existing Clean Air Act Rules

Clean Air Act, in general:

- Environmental technology industries provide direct employment in manufacturing pollution control equipment and also creates indirect employment in supporting industries and the service sectors, such as wholesale and retail trades.

- *Total number of jobs*, including both direct and indirect employment, grew from approximately 1.3M in 1977 to 3.2M in 2002.[1]

- A 2010 study estimated average employment impacts associated with the manufacture, installation and operation of a scrubber and found:[2]
  - Short term job gains, depending on scrubber size, of 40-1,000 jobs per scrubber for construction and installation.
  - Long-term job gains, depending on scrubber size, of 6-103 jobs per scrubber for operation and maintenance.

CAIR, specifically:

---

[1] *Saha Bansari, Barry Gale, Lou Browning, and Jim Staudt, "The Clean Air Act Amendments: Spurring Innovation and Growth While Cleaning the Air," Report Prepared for U.S. EPA by ICF Consulting, October 27, 2005.*

[2] *Jason Price, Nadav Tanners, Jim Neumann (IEc) and Roy Oomen (ERG), Employment Impacts Associated with the manufacture, Installation and Operation of Scrubbers, Memo to Ellen Kurlansky, January 15, 2010.*

- The Institute of Clean Air Companies estimates "that **over the past seven years, the implementation of CAIR Phase I resulted in 200,000 jobs in the air pollution control (APC) industry**...
    - "Specifically, a **typical turnkey installation of a 500MW scrubber is estimated to employ approximately 200 people, with about 80% dedicated to construction and 20% for engineering and project management.**[3]

NOx SIP Call, specifically:

- The Institute of Clean Air Companies estimated that **approximately 71 gigawatts (139 units) of SCR capacity was installed from 2000-04, in the NOx SIP Call region resulting in approximately 24,000 direct man-year jobs and 36,000 indirect jobs.**[4]
    - The NOx SIP Call required 23 eastern states and the District of Columbia to participate in a regional cap-and-trade program in order to address regional transport of ozone across state boundaries, starting in 2003-04.

Transport Rule and (Utility) Toxics Rule, specifically:

...In these current market conditions the APC industry is in a period of underutilization as compared to the NOx SIP Call and CAIR Phase I years...
...Many of the technologies that will be needed to be be installed to comply with the proposed Interstate Transport Rule and the as yet-to-be-proposed utility MACT rule are likely to be the same technologies installed in recent years for other successful and more labor-intensive programs."
Letter from David C. Foerter, ICAC Executive Director, to Senator Tom Carper, Nov 3, 2010.

4) Handy Quotes: Jobs vs. Environment Tradeoff Myth

"The possibility that workers could be adversely affected by increasingly stringent environmental policies has led to claims of a "jobs versus the environment" trade-off by both business and labor leaders. The present research examines this claim at the industry level for four heavily polluting industries: pulp and paper mills, plastic manufacturers, petroleum refiners, and iron and steel mills. Combining a unique plant-level data set with industry-level demand information, we find that increased environmental spending generally does *not* cause a significant change in employment.

---

[3] *Taken by the Institute for Clean Air Companies (ICAC) from Engineering and Economic factors Affecting Installation of Control Technologies for Multipollutant Strategies; US EPA, 2002*

[4] *Memo from David C. Foerter, ICAC Executive Director, to Ellen Kurlansky, December 28, 2010.*

Richard Morgenstern, Willam A. Pizer, and Jhih-Shyang Shih, Jobs Versus the Environment: An Industry-Level Perspective, Journal of Environmental Economics and Management, Volume 43, Issue 3, May 2002, Pages 412-436.

"Environmental costs are generally below 2 percent of total business costs. Firms that do leave the U.S. generally do so in pursuit of lower labor and health-coverage costs, expenditures that form a much higher percentage of their total costs. Economists searching for evidence supporting widespread flight of polluting industries have not found significant effects."

Environmental Regulation and the Competitiveness of US Manufacturing: What does the evidence tell us? *Journal of Economic Literature*, Vol. 33, No. 1, (Mar 1995), p. 132-163, http://www.ucl.ac.uk/cserge/Jeffe%20et%20al%201995.pdf.

"We find strong econometric evidence that South Coast regulations have induced very large investment in air pollution abatement capital and visual evidence that it has induced increases in abatement operating costs. Surprisingly, we find no evidence that these large costs incurred to abate emissions had more than a negative, transitory effect on the productivity of South Coast refineries. These refineries suffered a productivity decline in the 1980s but recovered to the national average by 1992, despite their heavy regulatory burden. In fact, petroleum refining productivity in the South Coast Air Basin between 1987-1992 rose sharply during this period -- when several environmental regulations came into compliance *and* when productivity was *falling* in this sector elsewhere in the country. What this suggests is that pollution abatement control expenditures associated with the SCAQMD regulations may, in fact, have been productivity enhancing so that the gross cost of pollution abatement may be an over-estimate of the net cost of regulation."

The same study compared productivity in California refineries compared to Texas and Lousiana refineries that were not nearly as heavily regulated, and found better productivity in California, and no evidence of job losses related to environmental regulation.

Environmental Regulation and Productivity: Evidence from Oil Refineries Eli Berman and Linda T.M. Bui, September 1998, revised May 1999.

5) Environmental Technology / Pollution Control Industry – Stats

From ICF 2005:

For example, according to an EPA study, for every direct employment sustained by the environmental technologies industries, the economy also created another indirect job in the upstream industries (for a multiplier effect equal to 2).[32] Table 3 presents the estimated employment levels for the environmental technologies industries using data from the EPA study.

Table 3: Economy-Wide Employment in Environmental Technologies Industries

	1977	1982	1985	1988	1991	2002[1]
Direct	682,778	642,467	657,243	697,326	744,322	1,600,000
Indirect	629,804	794,823	832,426	687,138	875,175	1,600,000
Total	1,312,582	1,437,290	1,489,669	1,384,464	1,619,497	3,200,000

1Direct employment for 2002 is based on ITA figures. See text for explanation of the indirect employment number. Source: EPA, 1995 and ITA.

According to the study, the environmental technologies industries contributed to more than 1.3 million total jobs (direct plus indirect) in the U.S. economy between 1977 and 1991. Out of this total, approximately one-half were estimated to be indirect jobs in upstream industries and jobs resulting from the consumption expenditures of workers in the environmental technologies industries.

31 See "Environmental Technologies Industries—Industry Facts." U.S. Department of Commerce, International Trade Administration. Available at web.ita.doc.gov/ete/eteinfo.nsf.
32 See "The U.S. Environmental Protection Industry: The Technical Document." U.S. Environmental Protection Agency, Policy, Planning, and Evaluation. EPA 230-R-95-012. 1995.

6) Job Impacts from Upcoming Clean Air Act Rules

(from Q & A for 6-15-11 hearing)

Boiler/Incinerators

Final: February 21, 2011

What are the estimates of industry and EPA of jobs related to the boiler rule?

- **EPA estimates that on balance the boiler standards alone will lead to a net creation of 2,200 new jobs.** The jobs include additional support at the facility to operate and maintain pollution control equipment and to incorporate work practices that reduce emissions.
    - EPA's analysis does not include any jobs created to manufacture and install equipment to cut air pollution. If it had included equipment installation jobs the analysis would likely show more jobs created.

- **CIBO (Council of Industrial Boiler Owners) estimated 338,000 jobs lost.[5] CIBO's analysis does not acknowledge any possibility for job growth.**
    - EPA's review indicates the CIBO study significantly overstates the negative impact of these rules and ignores the potential for the rules to improve public health and create jobs.
    - The CIBO estimate also assumes much higher costs to comply with the rules.
    - The CIBO approach seems to assume industry is inflexible and incapable of adapting to market changes. Experience shows that this is not the case.

[5] The Economic Impact of Proposed EPA Boiler/Process Heater MACT Rule on Industrial, Commercial, and Institutional Boiler and Process Heater Operators", Aug 2010 (based on EPA's proposal).

Cement Kilns

Final: August 6, 2010. EPA is currently reconsidering technical changes.

Q: Won't the cement kiln standards result in job losses in this industry?

- EPA estimated a net increase in employment of 300 jobs.
- More specifically, EPA estimates that potential job impacts will range from 600 jobs lost to 1,300 jobs gained. We do not have plant specific job estimates. The net increase might include some plant workers losing jobs and other workers with a different set of job skills gaining jobs.

Transport Rule 1

Proposed: July 2011, Final: to take place around June 30, 2011.

The RIA describes in detail the estimated costs and benefits of the proposed rule in 2014:

- The proposed rule would yield more than $120 to $290 billion in annual benefits in 2014
  - The benefits are primarily from 14,000 to 36,000 fewer PM2.5 and ozone-related premature mortalities.
  - There are some costs and important benefits that EPA could not monetize.
- The benefits far outweigh the estimated annual costs of $2.8 billion.
- This rule gets larger emission reductions more quickly than CAIR required.

Response to key economic or jobs criticisms

- In 2014, the benefits of this rule are estimated at over $100 billion dollars annually; the costs are estimated at less than $3 billion annually. As a result, EPA believes this rule provides overwhelming net benefits to the American people.
- The rule is expected to have a very modest impact on consumers:
- By 2014, average retail electricity prices are projected to increase roughly 1.5 percent with the proposed Transport Rule. For example, in 2014 if you spend $100 per month on your electric bill, your bill is estimated to increase by $1.50 as a result of this proposal.
- EPA projects that natural gas prices would increase by less than 1.7 percent in 2012 and less than 0.5 percent by 2014 with the Transport Rule.
- Although this proposal will require companies to spend money on pollution controls, that money will employ people to build component parts, and design, install, operate, and maintain the controls.

Did EPA analyze jobs impacts of the clean air transport rule?

- No jobs analysis was completed for the transport rule proposal. At the time of the proposal, there was neither time nor interest to warrant such an analysis.
- However, it is important to note that we are completing a jobs analysis now for the final rule in order to be sensitive to jobs issues.

National Ambient Air Quality Standard for Ozone Standards

Proposed: January 2010, Final: End of July 2011

Does EPA's proposed ozone standard create jobs?

- EPA looked at national, regional, and local employment data in nonattainment areas versus attainment areas for PM and ozone. We did not find an obvious effect of attainment status in the overall trend s in either total employment or employment rates over time. In general, the data show that the trends in both total employment and employment rates rose and fell according to the same patterns in attainment and nonattainment areas.

Did/will EPA analyze jobs impacts for the ozone standard?

- EPA's analysis of the ozone standard includes the costs to reduce emissions in areas that will likely have to clean up their air. At proposal, EPA estimated costs of the standard to be between $19 billion and $90 billion, and benefits to be between $13 billion and $100 billion, depending on the NAAQS level chosen.
- However, there are no job gains or losses analyzed for this rulemaking. Jobs analyses are not performed for NAAQS standards because the NAAQS standards do not impose direct requirements on industry and other pollution sources. The NAAQS standards establish an acceptable air quality level for outdoor air for each of six common pollutants based on public health; state and local air pollution control agencies then determine how to meet the standards.

National Ambient Air Quality Standard for Particle Pollution

Proposal: Later this year (2011)

Have the EPA's PM standards created or cost the economy jobs?

- We have not yet made a decision about whether to revise the PM standards. We expect to do so later this year.
- However, EPA did look at national, regional, and local employment data in nonattainment areas versus attainment areas for the current PM and ozone standards. We did not find an obvious effect of attainment status in the overall trend s in either total employment or employment rates, over time.

- In general, the data show that the trends in both total employment and employment rates rose and fell according to the same patterns in attainment and nonattainment areas.

Will EPA analyze jobs impacts for any PM standard?

- EPA will complete a cost and benefit analysis that will be released with any proposed standard.
- This will not include information on job gains or losses. Jobs analyses are typically not performed for NAAQS standards because the NAAQS standards do not impose direct requirements on industry and other pollution sources. The NAAQS standards establish an acceptable air quality level in the outdoor air for each of six common pollutants based on public health; state and local air pollution control agencies then make choices about how to meet those standards.